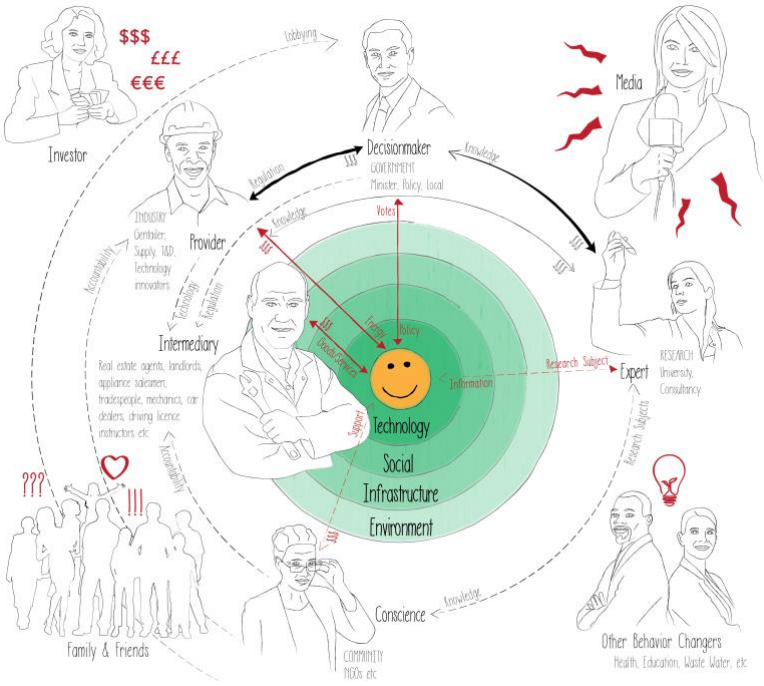
International Energy Agency
Energy Technology Initiative on
Demand Side Management Technologies and Programmes



Subtask 10:

Task 24 – Phase II

Behaviour Change in DSM: Helping the Behaviour Changers

Summary of key outputs, insights & recommendations

March 2019

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With many thanks to all the participating country sponsors and national experts

Contents

Summary of key outputs, insights & recommendations

This is the final report of IEA DSM Task 24, the first global research collaboration on behaviour change in DSM. It ran from early 2012 to early 2019 and here are some of its highlights:

- **11 countries** participated financially (eight in Phase I and six in Phase II)
- **400+ experts** from over 200 institutions & organisations and 20+ countries collaborated
- Almost **100 publications** including an **ERSS special issue** on Storytelling and Narratives
- Over **60 expert and stakeholder workshops** including **five special sessions** at the largest behaviour change conferences (BECC, BEHAVE, Energy Cultures)
- **60 presentations** at major conferences, international workshops, seminars, lectures, including many keynotes
- Co-developed several **award-winning pilots** and tools
- Leveraged over **$1m of in-kind** research and expert support.

We studied a huge number of behaviour change approaches and interventions (policies, programmes and pilots) from many different sectors:

- **Residential** (including building retrofits, insulation subsidies, Energy Performance Certificates, smart home technology, energy-efficient technologies, smart meter uptake and data feedback, time-of-use tariffs, mass marketing campaigns, internet-of-things, design-by-intent, HERs, energy saving kits, nudges, energy widget programmes, energy audits, competitions, goal setting, public pledges, thermal imaging, energy labels, PV uptake, P2P neighbourhood sharing, smart home labs, storytelling, social norm feedback, automation, energy provider switching, barrier research…)
- **Small to medium businesses** (nudges, deeds, Crown loans, goal-setting, competitions, storytelling, automation, associations, smart technology, office switching, building retrofits, energy-efficient technologies, barrier research…)
- **Industry** (carbon neutral pledges, process heat recovery, renewable energy technology, energy manager training, smart grid pilot, green leasing, storytelling, ESCo facilitators…)
- **Health** (building operator training, energy systems fault logging, storytelling, relationship management, cultural change, CBSM, design thinking…)
- **Education** (ICT use, training, information campaigns, competitions, social norming, energy saving kits, goal setting, public pledges…)
- **Government incl. municipalities** (public referenda, national targets, international agreements, energy efficiency and building directives, regulators, subsidies, taxes, legislation, public infrastructure, district heating and cooling…)
- **Transport** (public transport campaigns, cycling campaigns, driver behaviour nudging, mode shifting, fleet driver behaviours, regulation, EV uptake, fuel-efficient vehicle uptake, congestion pricing, carpooling, mobility-sharing Apps, driver feedback Apps, EV charging station Apps, storytelling…).

We also looked at many different research disciplines, models of understanding behaviour, and theories of change:

- **Economics** (classical economic / rational choice theory, neoclassical economics, new economics, evolutionary economics, behavioural economics, nudging, deficit model…)
- **Psychology** (cognitive psychology, Theory of Planned Behaviour, learning psychology, social psychology, behavioural socio-ecology, environmental psychology, Schwartz model on activation of moral norms, Robert Cialdini's Principles of Persuasion Influence, Triandis Model, 4E, Value Action Gap, motivational theories, Kurt Lewin's freezing and unfreezing, Norm Activation Theory, Stern's Principles of Intervening, Expectancy Value Theory…)
- **Sociology** (cultural aspects and sociology of consumption, user innovation, STS, Practice Theory, social norms, Energy Cultures, ethnography, anthropology, human geography, activity-based models, ethics, systems thinking…)
- **Education** (constructivism as a learning theory, shared learning, double-loop learning …)
- **Business** (Energy Cultures, Rogers diffusion of innovation, design-with-intent, collective impact approach…)
- **Communications and Marketing** (CBSM, social marketing, mass marketing, digital communications, segmentation, audience tailoring, Most Significant Change technique, storytelling…).

Our audience (who we called energy end users) was also very varied and in our field pilots we tried to establish their various contexts influencing their behaviours (both demographic and psychographic: other people / societal, cultural and traditional influences, social and cultural norms, values, political factors, policies and legislation, physical infrastructure and technology, geography and climate and socio-economic factors):

- **Households** (owners, tenants, single-homes, multi-family apartments, social housing, community housing, utility customers…)
- **Businesses** (landlords, commercial tenants, building operators, energy and facility managers, nurses, ESCo facilitators, C-suite, consultants, vendors, contractors, lawyers, utility customers…)
- **Universities** (students, academics, green teams, ICT staff, janitors…)
- **Mobility** (personal vehicles, fleet drivers, cyclists, EV drivers, pedestrians…).

From this vast number of case studies, models and pilots, we certainly learned a lot. Individual lessons from each of the participating countries in Phase II are shown in their policy briefs below. The recommendations for participating countries in Phase I can be found in Subtask 2 publications[1].

The overarching, general lessons that this Task taught us are the following:

- Getting **definitions** right is really important, there is a vast spectrum of what different sectors, countries and stakeholders understand as energy behaviour and associated behaviour change interventions ➔ We found that developing our own Task 24 definitions that are as broad and encompassing as possible, helped in framing the message.
- It is very **difficult to prove** that a behavioural intervention actually changed behaviours ➔ A large part of our work (see Rotmann and Ashby, 2019) focused on how to evaluate behaviour change interventions, acknowledging that establishing causal relationships is hard.
- There are many different ways to **evaluate behavioural interventions**, with randomised control trials (RCTs) being the gold standard but by far not the only method ➔ We learned that we need to **triangulate qualitative with quantitative** data to get the best insights.
- There is **no one silver bullet** model, theory or intervention for achieving successful behaviour change ➔Thus, we learned that we need to be **flexible and creative** as energy-using behaviour is incredibly complex.
- **All models are wrong** but some of them are useful! ➔ Finding the right model or theory for the right behaviour and behaviour change intervention is imperative.
- ***Homo economicus*** doesn't really exist, people aren't 100% utility-maximising ➔ Albeit, **economic models** are still the most prevalent in behavioural interventions, with behavioural economics slowly coming up the ranks.
- **Habits** are the most difficult thing to break and they're ~95% of our energy use and not easily changed using individualistic approaches ➔ We need to acknowledge that there is no such thing as **individual energy use**, it is almost always informed by wider social influences, norms, tradition etc.
- We need to focus on **whole-system, societal change** to avoid the runaway climate change and mass extinction catastrophes that are already underway ➔ This simply cannot be done in isolation by any one sector – **collaboration** among a wide variety of stakeholders (in government, industry, research, the third and service sectors) is key.
- We need to facilitate **shared learning** and collaboration in multiple stakeholders, which is difficult and often suffers from translation issues and conflicting mandates ➔ Thus, we need a **common language** – we found **narratives** really work, as do **cross-country case study comparisons** to learn from different contexts and avoid duplication of efforts (and mistakes!)
- We need to create **collective impact** ➔ Task 24 and its project partners have developed the right tools and processes based on good social science practice & design thinking.
- **This is only the beginning**.

As a final summation of our learnings after 7 years of studying this complex issue globally, and with some of the most respected and learned experts in the field, is that urgent change is indeed necessary - not just individual and societal behaviour and culture change, *but the Behaviour Changers also need to change their behaviours so that a system change can happen*.

[1] www.ieadsm.org/task/task-24-phase-1/

US POLICY BRIEF

Mandated Energy Efficiency Targets: Utilities in the U.S. are often investor-owned and are mandated to run cost-effective energy efficiency programmes; because human behaviour is less predictable than technology, evaluation standards are higher and, consequently, fewer programmes are labelled as behavioural in the U.S.

Opportunities for Programme Evaluation: There is a need for credible and accepted evaluation approaches for behavioural programmes, other than randomised control trials (RCTs). This may be best addressed via a concerted collaboration between regulators and programme implementers.

Effect of Programme Origin: As a result of different origins, U.S. and European programmes differ in scale and emphasis. U.S. programmes operate on a larger scale than in Europe and federally-managed European programmes place a higher emphasis on non-energy benefits.

WHAT'S THE ISSUE & WHY IS IT IMPORTANT?

The scale of energy efficiency efforts in North America is vast. In the U.S. and Canada alone, more than $8 billion USD are spent annually on energy efficiency programmes, which far outpaces most other countries (CEE 2018a). These programmes are often (though not exclusively) run by investor owned utilities (IOUs), as opposed to Europe's mostly government-run programmes. As a result, many IOUs are mandated to meet energy efficiency targets, and programmes that count towards these targets must meet cost-effectiveness and other evaluation requirements.

Behavioural social science techniques can be leveraged to enhance savings from energy efficiency programmes. However, humans - and any energy usage changes caused by their behaviour - are much less predictable than energy-efficient equipment. Thus, estimating savings from behaviour is more challenging and therefore requires higher evaluation standards in the U.S. and Canada. As a result, the randomised control trial (RCT) was, and remains, the gold standard for evaluation of behavioural programmes. Yet not all programme approaches are evaluable via RCTs, and other rigorous and credible evaluation methods have not been widely accepted as alternatives. Consequently, many energy efficiency efforts that would be considered behavioural in other countries are not labelled as such in the U.S., and it can be difficult to demonstrate the value and gain approval for programmes with behavioural elements.

Despite these challenges, programme administrators in the U.S. and Canada continue to run over 100 programmes that include behavioural elements across the residential, commercial, and industrial sectors (CEE 2018b). To address the ongoing challenge of detecting energy usage changes, the U.S. chose to focus its one year of Task 24 participation on ***behavioural programme evaluation methods, credibility and persistence.***

APPROACH AND METHODS

U.S. participation in the last year of Task 24 was made possible by a collaboration between the U.S. Department of Energy (DOE) and the bi-national Consortium for Energy Efficiency (CEE). CEE is the non-profit consortium of energy efficiency programme administrators, and its membership directs nearly 80 percent of the $8.8 billion in annual energy efficiency expenditures in the U.S. and Canada.[1]

The data collection and synthesis process included:

- Two surveys of the 11 CEE member organisation sponsors of this project about their behavioural programmes, which included four questions each and was sent to ten organisations and completed by eight semi-structured interviews of 10 CEE member organisations; interviews consisted of 10 questions, lasted around one hour, and provided insight into programme administrators' regulatory barriers and evaluation challenges
- Interviews with three IEA DSM Task 24 experts from other countries and one former U.S. regulator
- Two U.S. Task 24 workshops, which were attended by 15 unique U.S. and Canadian organisations
- An IEA DSM Task 24 Workshop in Zürich, Switzerland, which was attended by almost 60 individuals from over 20 countries, and collected expert insights on behaviour
- A synthesis of CEE member organisation behaviour programme data from seven years of implementation, including 279 programmes run by 78 organisations
- Input from a total of 42 unique CEE member organisation staff during two CEE Program Meetings in the U.S.
- Input from the international behaviour community during the Behavior, Energy, and Climate Change (BECC) Conference in Washington, DC, U.S.

These data were triangulated and synthesised to identify the key themes that are outlined in the Final Report and this Policy Brief.

FINDINGS

Persistence

Measuring the persistence of programmes' achieved behaviour changes and related energy savings is especially necessary because human behaviour is more variable than energy-efficient equipment. Research on persistence is more prevalent in the U.S. than other countries, and has primarily examined the decline in savings when Home

Energy Report (HER) programmes stop sending reports to customers. Initial findings suggest decay rates ranged from 2 to 30% per year, and often reach 20% during the first year (Ashby et al. 2017). These findings demonstrate that persistence is tangible and measurable, but this wide range in decay rates indicates further research is needed to understand persistence in HER and other programme types.

Behavioural Programme Evaluation
Not all programmes which were considered behavioural in the U.S. were evaluated as behavioural programmes. Currently, the RCT is most commonly used to evaluate behavioural programmes in the U.S. Though qualitative evaluation methods are sometimes used, it is typically for process, rather than impact, evaluations. There may be great value in expanding impact evaluation approaches for behavioural programmes to include other techniques, such as qualitative methods, quasi-experimental designs, and normalized metered energy consumption.

Learnings from European Peers
Wider regulatory latitude in Europe as compared to the U.S. and Canada has resulted in the opportunity for innovative European efforts to shift energy usage behaviours. While cultural and societal differences between the U.S. and the European countries represented in the Task 24 case studies limit direct transplantation of successful approaches to the U.S., they broaden the horizon of techniques to consider, adapt, and test in the U.S.

Behavioural Terminology
Any interaction between an energy end user and energy-using technology is behaviour. However, behaviour terminology is often associated with simple habitual, short-term actions such as turning off lights.
Some utilities have shifted away from referring to behavioural programmes as such in order to avoid concerns about the durability of achieved behaviour changes. If the goal of behavioural programmes is to move beyond deemed measures such as the purchase and installation of hard measures, then there needs to be some distinction between acquiring new energy-efficient equipment and taking actions that reduce energy usage. One approach that could help address this challenge is a concerted effort to shift the language used to describe these programmes; rather than referring to "behaviour programmes," we recommend instead referring to the behavioural tools and processes that can effectively be used to enhance programmes across all sectors.

Programme Scale and Programme Origins
Over the course of this work, several substantial differences emerged between energy efficiency programmes in the U.S. and Europe. For example, in Europe, federal government entities often manage efficiency efforts, whereas in the U.S., programme administrators typically implement programmes. Given the broader interests of a federal entity, European programmes often weight non-energy impacts (NEIs) more heavily than their peers in the U.S. Moreover, tens of thousands of customers often participate in programmes in the U.S., as opposed to hundreds in Europe. Due to differences in evaluation requirements between the U.S. and Europe, this difference in sample sizes affects whether any determination of causality of resulting energy savings will be viewed as credible in the U.S.

RECOMMENDATIONS

For Programme Implementers:

1. *Plan to measure persistence*: To improve our understanding of how long programme savings last, we must proactively design programmes to capture this information after the initial programme has ended.
2. *Continue to look to peers abroad:* Despite regulatory differences, Europe can serve as a proving ground for new programme approaches that may be ripe for testing or piloting in the U.S.
3. *Words matter*: Refer not to "behaviour programmes," but instead to "behavioural tools" and/or "behavioural processes."
4. *New opportunities:* Consider opportunities to co-create with regulators programmes that include behavioural techniques to allow buy-in from both parties upfront. Test these programmes in smaller-scale pilots first.

For Regulators and Policy-Makers:

1. *Attempt to include non-RCT evaluation methods for behavioural programmes* when savings for a programme are well established or alternate methods are more appropriate.
2. *Consider opportunities to co-create with utilities new programmes that include behavioural techniques* to allow buy-in from both parties upfront.

ACKNOWLEDGEMENTS

With many thanks to CEE staff Veronica Alix and Jennifer Smith, and our 11 CEE member sponsors who made U.S. participation in Task 24 possible.

SOURCES

Ashby, K., Gutierrez, V., Menges, S., and Perich-Anderson, J. (2017): *Keep the Change: Behavioral Persistence in Energy Efficiency Programs*

CEE (2018a): *2017 State of the Efficiency Program Industry: Budgets, Expenditures, and Impacts*

CEE (2018b): *2018 Behavior Program Summary*

FURTHER INFORMATION

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NEW ZEALAND POLICY BRIEF

- **People need to be the main focus when developing behaviour change interventions:** The transformation of the energy system can only be achieved sustainably and effectively, if the energy end users are involved and their context and needs understood. Another group of people who are hugely important in successful behavioural interventions are Behaviour Changers from government, industry, research, the third and service sectors collaborating on intervention design, implementation and evaluation.
- A **variety of DSM- and behaviour change tools and approaches** are needed to motivate and engage *Behaviour Changers* to implement these interventions successfully.
- The **Top 3 behavioural DSM-issues in New Zealand** are: 1) P2P platforms for sharing renewable energy across neighbourhoods, 2) Home energy audit toolkits, 3) Improving uptake of electric vehicles (EVs).
- **Evaluation of (non-kWh) co-benefits** is required to make the implementation of behavioural interventions more attractive and it is important to evaluate behavioural pilots to prove actual change has taken place.

WHAT'S THE ISSUE?

As environmental and societal pressures continue to rise, OECD governments are doing more and more to meet rising energy needs with greater sustainability policies. Low carbon policies and targets, as well as the *Paris Accord* are shaping the future of our energy system. We have taken great inroads into increasing the proportion of renewable energy technologies, with rapid cost reductions and are tracking towards low carbon electricity production but these changes remain insufficient.

It is clear that current efforts and technologies will not be enough to achieve a 1.5C climate change target. Results from transformation studies show us that an effective change of our energy system can only work effectively if the affected *people* are involved in the process. In the New Zealand participation in the second phase of Task 24 we focussed on two main issues: 1) P2P platforms to enable energy-sharing neighbourhoods 2) Home Energy Audit Tool (HEAT) kits.

WHY ARE THESE ISSUES IMPORTANT?

The two main topics were chosen by industry and local government co-funding of Task 24.

- **Peer to peer (P2P) platforms to enable energy-sharing neighbourhoods:**

The energy system is rapidly changing, even though infrastructural decisions and investments are often taken with a 50+ year time frame. In order to avoid technology lock-in, our lines company co-funder *PowerCo* planned to develop a P2P pilot, called "Powering Tomorrow's Neighbourhoods", as part of the Task 24 case study. It would enable novel electricity supply consumer choices and services that promote energy community and energy "sharing" outcomes through offering demand-side management services. This pilot followed on the case study analysed by Task 24 in Subtask 2, called "Powering Tomorrow's Homes" (Rotmann and Silk, 2014). Although the programme continued, it grew as collaboration with other market participants, and NDA contracts meant that these insights couldn't be shared.
During the last few years a number of peer to peer retail offerings emerged in the NZ marketplace.

- **Home Energy Audit Tool (HEAT) kits**

Several countries use home energy saving kits (called "HEAT kits" by Auckland Council) to promote energy education and empower households to measure and learn about their home's energy performance. These kits are loaned out for free using Public Libraries as "Middle Actors". We compared and contrasted energy saving kits between several countries, but undertook an in-depth evaluation of the performance of such kits in both Ireland (see SEAI, 2018) and New Zealand (Rotmann, 2018a). Use of the Task 24 "beyond kWh" toolkit was assessed using pre-and post-surveys in Ireland (Rotmann & Chapman, 2018) and compared with NZ's HEAT kit evaluation.

WHO AND HOW CAN WE CHANGE?

Once the main issues were identified, we used tools like the Task 24 Behaviour Changer Framework (Rotmann, 2016) to delve deeper into understanding them better. The framework provides a visualisation, communication and analysis tool to relate DSM-issues with their associated *Behaviour Changers* and end users. This framework gets used in association with other creative and engaging Task 24 tools, such as storytelling and a "beyond kWh" evaluation tool (see Subtask 8 – Toolkit for Behaviour Changers). All five *Behaviour Changer* groups in New Zealand were found to be highly relevant and engaged. Even though the initial Subtask 6 Pilot evolved out of scope, the Task helped in leaving communication and collaboration channels open between different Behaviour Changers.

The Task 24 tools are tried and tested and perform very strongly, in real life. For example, Task 24 has applied the Behaviour Changer Framework in more than 30 workshops, including four in New Zealand.

WHAT CAN POLICY MAKERS DO?

Concerning our two most relevant DSM issues, the following recommendations for policy makers are given. In general, to solve any behavioural DSM issue, all *Behaviour Changers* need to collaborate and communicate with each other and with the end users whose behaviour they are trying to change.

P2P sharing platforms:

Connecting the consumer groups (via the market and attractive services) shifts thinking from optimising a single home to a community via energy sharing. It creates value and more optimal outcomes including prosumers needing to invest less in change and technologies, allow demand-responsive consumers to access their energy at better rates and could incentivise more locations-based PV installations. Seeing this space is relatively new, yet offers vast potential for energy system transformation, it was prudent that the *Electricity Authority* went out for mass market consultation on future participation in this innovative development. This was based on the realisation that different participants within a supply chain (e.g. the electricity supply chain) looking at disruptive technologies face very different challenges, future expectations and motivations. Traditional players within sectors may face similar practices, norms, organisational structures and physical characteristics but still respond differently based on their position in that chain, ownership structure or regulatory model. New entrants enabled by the disruption bring often even more diverse responses. The government is ultimately trying to understand how to remove barriers to market as technologies and customer participation evolves. Open and transparent communication and collaboration channels help with this task.

HEAT kits:

From the cross-country case study comparison (Rotmann 2018b) it became clear that even though project managers regard these kits as highly successful, they were not able to point to any actual behavioural changes that resulted from high loan rates of the kits. Better evaluation, including the use of Task 24's pre- and post-intervention "beyond kWh" tool, is one way to better understand what the main barriers to uptake are and what other support households expect from the government. This work may lead to further development of the usefulness of these HEAT kits with a gamified App.

FINAL RECOMMENDATIONS

- Make people your main focus
- Have a variety of DSM- and behaviour change tools and best practice examples to learn from and share
- Collaboratively identify your main issues and develop shared goals
- Identify and evaluate multiple benefits of your intervention, from different stakeholder perspectives
- Co-create pilots and field research trials.

SOURCES

Rotmann & Silk, 2014: Subtask 2 – NZ Case Study „Powering New Zealand's Homes"

Rotmann S., 2016: How to Create a 'Magic Carpet' for Behaviour Change, BEHAVE 2016

Rotmann S., 2018a: Case Study Analysis – Home Energy Audit Tool (HEAT) kits in New Zealand

Rotmann S., 2018b: Cross-Country Case Study Comparison Ireland – Home Energy Saving Kit Library Programmes

Rotmann S., 2018c: Final Report New Zealand

Rotmann & Chapman, 2018: Evaluation Report for Home Energy Saving Kits: Using Bayesian Modelling to test the "beyond kWh" toolkit in Ireland

SEAI, 2018: Final Report Ireland – Home Energy Saving Kit Programmes

Subtask 8: Toolkit for Behaviour Changers

FURTHER INFORMATION

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1. Task 24 Phase 2: www.ieadsm.org/task/task-24-phase-2/

AUSTRIA POLICY BRIEF

People need to be the main focus when developing behaviour change interventions: The transformation of the energy system can only be achieved sustainably and effectively, if the energy end users are involved and their context and needs understood. Another group of people who are hugely important in successful behavioural interventions are *Behaviour Changers* from government, industry, research, the third and service sectors collaborating on intervention design, implementation and evaluation.
A **variety of DSM- and behaviour change tools and approaches** are needed to motivate and engage *Behaviour Changers* to implement these interventions successfully.
The **Top 3 behavioural DSM-issues in Austria** are: 1) Approval of behavioural DSM-interventions into the Austrian Energy Efficiency Act, 2) Behavioural interventions to trigger e-mobility and innovative sharing offers, 3) DSM measures in office buildings.
Evaluation of (non-kWh) multiple benefits is required to make the implementation of behavioural interventions more attractive.
Behavioural interventions to trigger e-mobility and innovative sharing offers in Graz need more financial and communication resources, more involvement of end users and participants, and a pilot project to improve uptake and evaluate successes to date.

WHAT'S THE ISSUE?

It is clear that current efforts and technologies will not be enough to achieve a 1.5C climate change target. Results from transformation studies show us that an effective change of our energy system can only work effectively if the affected *people* are involved in the process. In the Austrian participation in the second phase of Task 24 we focussed on two main issues: 1) Approval of the ENERGIES@WORK behaviour change campaign into Austrian energy efficiency law 2) DSM interventions to trigger e-mobility and innovative sharing offers.

WHY ARE THESE ISSUES IMPORTANT?

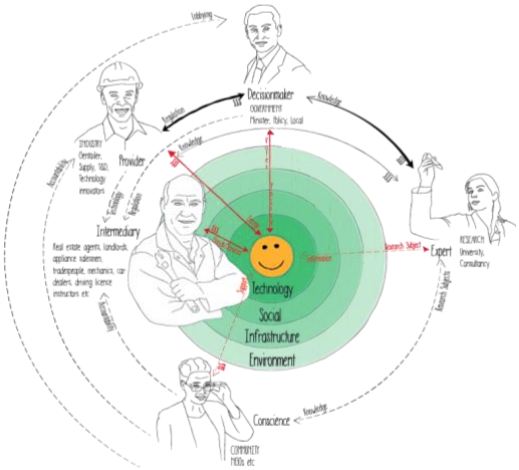
In Austria, we analysed the Top behavioural/DSM issues. They were:

1. Accepting behavioural interventions into the Austrian Energy Efficiency (EE) Act

We found that DSM interventions are interesting for *Behaviour Changers* only when they lead to significant, provable energy savings. The Austrian EE Act plays a central role in this. Current methods of accepting interventions into the law turned out to have little motivation for behavioural measures, as there are no methods or prompts provided in the official methods document. This is why Task 24 in Austria focussed on the design of a method for approval of behavioural DSM-interventions into this law. Implementing institutions are public authorities; industry, energy supply companies and SMEs, and the target end user group are employees in public and private institutions.

2. DSM-interventions to accelerate e-mobility and innovative sharing offers

In 2016, 0.24% of all newly registered vehicles in Austria were electric vehicles (EVs). In order to accelerate their market penetration, and to raise awareness among the population, more diverse approaches are needed. Currently, interventions are largely based on financial incentives in forms of funding, financial support for EV purchases etc. Well-designed behavioural interventions are required in this field. These interventions can be implemented in various ways, including: driver training, information campaigns, environmental zones, city tolls, regulations such as CO_2 tax, prohibiting certain highly-polluting vehicles, funding and financial subsidies for environmental-friendly vehicles, innovative mobility offers and many more. Potential implementing institutions of behavioural interventions to accelerate e-mobility are political, administrative and governmental institutions; companies offering e-vehicles; science and research agencies and eco-social institutions. Among the end user target groups are all people with a need for transport such as inhabitants in a certain region/city or tourists.



WHO AND HOW CAN WE CHANGE?

Once the main issues were identified, we used tools like the Task 24 Behaviour Changer Framework to delve deeper into understanding them better. The framework provides a visualisation, communication and analysis tool to relate DSM-issues with their associated *Behaviour Changers* and end users. This so-called "magic carpet" framework gets used in association with other creative and engaging Task 24 tools, such as storytelling using a fairy tale story spine and a "beyond kWh" evaluation tool. For both of our issues all five *Behaviour Changer* groups were found to be highly relevant and engaged.

Even though these tools sound rather whimsical, they are truly tried and tested and perform very strongly, in real life. For example, Task 24 has applied the "magic carpet" in more than 25 workshops, including in Austria on the two top behavioural DSM issues that were chosen.

WHAT CAN POLICY MAKERS DO?

Concerning our two most relevant DSM issues, the following recommendations for policy makers are given. In general, to solve any behavioural DSM issue, all *Behaviour Changers* have to collaborate and communicate with each other and with the end users whose behaviour they are trying to change.

Accepting behavioural DSM interventions into the Austrian EE Act:
To date, largely technical measures (kWh) are approved by the "Monitoringstelle" into the Act. Behaviour change measures can hardly be found. In order improve use of such interventions, the document and measurement methodology should be extended. Different incentives are needed to make companies and public authorities implement more behavioural DSM-interventions (e.g. in guidelines for the calculation of non-kWh benefits). *Experts, Providers* and *Middle Actors* are also asked to provide solutions to evaluate positive side effects of DSM-interventions (such as improved health, greater work productivity, higher quality of life, reduced air pollution etc.). In addition, best-practice case studies and pilot projects should be implemented by *Decision-makers* and their organisations to show leadership.

DSM-interventions to accelerate e-mobility and innovative sharing offers:
In Austria (we specially looked at the City of Graz), there is already a range of innovative (sharing) offers to accelerate e-mobility and alternative transportation. Among them are initiatives like the multi-modal sharing offer *tim*; *Lastenrad,* a social enterprise offering freight bicycles for free; various car-sharing initiatives etc. To further strengthen those solutions and improve uptake, *Decision-makers* are recommended to offer multi-channel information and communication campaigns to end users. More financial and infrastructure funding is necessary to trigger e-mobility and sharing-offers among end-users. Financial means are also needed for the implementation of additional case studies and pilot projects, which generate best-practice examples and evaluate existing offers. In addition, changes in regulations are needed to simplify the usage of innovative sharing offers.

FINAL RECOMMENDATIONS

1. Make people your main focus
2. Have a variety of DSM- and behaviour change tools and best practice examples
3. Collaboratively identify Top DSM-issues
4. Identify and evaluate multiple benefits
5. Co-create pilots and field research trials.

SOURCES

Austriatech, 2016: Elektromobilität in Österreich Zahlen & Daten. https://www.bmvit.gv.at/verkehr/elektromobilitaet/downloads/oesterreich2016_de.pdf

Kern F., 2017: Die Transformation des Energiesystems als sozio-technischer Wandel (presentation of 12.10.2017). https://tinyurl.com/y9aretug

Rotmann S., 2016: How to Create a 'Magic Carpet' for Behaviour Change', BEHAVE 2016 http://www.ieadsm.org/wp/files/Rotmann-BEHAVE-2016.pdf

Österreichische Energieagentur, 2013: Methoden zur richtlinienkonformen Bewertung der Zielerreichung gemäß Energieeffizienz- und Energiedienstleistungsrichtlinie 2006/32/EG

FURTHER INFORMATION

- Full Country Report Austria: http://www.ieadsm.org/task/task-24-phase-2/#section-8
- Task 24 Phase 2: www.ieadsm.org/task/task-24-phase-2/

SWEDEN POLICY BRIEF

- **People need to be the main focus when developing behaviour change interventions:** The transformation of the energy system can only be achieved sustainably and effectively, if the energy end users are involved and their context and needs understood. Another group of people who are hugely important in successful behavioural interventions are Behaviour Changers from government, industry, research, the third and service sectors collaborating on intervention design, implementation and evaluation.
- A **variety of DSM- and behaviour change tools and approaches** are needed to motivate and engage *Behaviour Changers* to implement these interventions successfully.
- The **Top 2 behavioural DSM-issues in Sweden** are: 1) tariffs and incentives to improve load shifting in buildings; and 2) split incentives between commercial building owners and their tenants and the usage of green leases in the commercial building sector.
- **Evaluation of (non-kWh) co-benefits** is required to make the implementation of behavioural interventions more attractive and it is important to evaluate behavioural pilots to prove actual change has taken place.
- **Behavioural interventions can be subject to political and market changes** and leading players can change with these forces. Creating an open space for communication and collaboration is essential for collective impact to occur.

WHAT'S THE ISSUE?

As environmental and societal pressures continue to rise, OECD governments are doing more and more to meet rising energy needs with greater sustainability policies. Low carbon policies and targets, as well as the *Paris Accord* are shaping the future of our energy system. We have taken great inroads into increasing the proportion of renewable energy technologies, with rapid cost reductions and are tracking towards low carbon electricity production but these changes remain insufficient.

It is clear that current efforts and technologies will not be enough to achieve a 1.5C climate change target. Results from transformation studies show us that an effective change of our energy system can only work effectively if the affected *people* are involved in the process. In the Swedish participation in the second phase of Task 24 we focussed on the uptake of green leases for commercial buildings.

WHY IS THIS ISSUE IMPORTANT?

The main topic was chosen by industry, research and government experts in Sweden:

Increasing the uptake of green leases for commercial buildings

Sweden set targets to become carbon neutral by 2045. Improving the energy performance of the buildings sector is a priority in Sweden, where ageing buildings create a challenge to achieve the ambitious climate goals. In 2014, the buildings sector in Sweden used 76.1 TWh, 27% of it was used by commercial buildings. Even though the energy use in the building sector has decreased during the last 30 years, there is an opportunity to decrease it even more, especially when existing buildings undergo a renovation.

There are several barriers that prevent the full energy efficiency potential in commercial buildings to be realised and one of these barriers is the split incentive problem between the building owner and the tenant. One policy instrument that corrects for split incentives is green leases between building owners and tenants, allowing for mutually-beneficial agreements between the two parties for the energy efficient operation of buildings. The uptake of green leases for commercial buildings in Sweden, however, has been slow and some of the barriers that were identified with the help of Task 24 workshops and national experts are as follows:

- Lack of willingness by building owners and tenants to use green leases more frequently;
- Some green leases can be considered "green washing"; and
- A perceived imbalance in benefits between tenants and landlords.

If the green leasing process could be improved it could lead to building owners undertaking energy-efficient measures that they would not do without the involvement and closer relationship with the tenants, including a better understanding of their specific needs. If green leasing was used more frequently and appropriately, this could lead to a significantly more efficient use of energy in the entire commercial building sector, and a better relationship between landlords and tenants, leading to a reduction in split incentives.

WHO AND HOW CAN WE CHANGE?

Once the main issues were identified, we used tools like the Task 24 **Behaviour Changer Framework** (Rotmann, 2016) to delve deeper into understanding them better and support multi-stakeholder facilitation. This framework gets used in association with other creative and engaging Task 24 tools, such as **storytelling** and a **"beyond kWh"** standardised evaluation tool, which was developed but not utilised (due to time constraints) for the pilot case study in Sweden. A **cross-country comparison**, led by a world expert on green leasing was published and a green leasing **pilot** for the Swedish Energy Agency's new office building was developed as part of the Swedish Task 24 participation.

Various "Behaviour Changers" were invited to the four workshops that were organised as part of the Swedish participation in the Task. Other than the Task 24 Operating Agent who acted as *Facilitator*, there were the Swedish Energy Agency as *Decisionmaker*, various major commercial landlords as both *Providers* and *End Users*, the Real Estate Owners Association "Fastighetsägarna" as *Middle Actor*, national and international research *Experts* from academia and consulting, and the Swedish Green Building Council as *the Conscience*. For the final workshop, where the focus was on the green leasing pilot that was being developed for the Swedish Energy Agency, the landlord for

the Agency's new building and the facility manager of the Agency were present. Their relationships and systemic conflicts were explored in the Task 24 "magic carpet" exercise.

WHAT CAN POLICY MAKERS DO?

Concerning the most relevant DSM issue, the following recommendations for policy makers are given:

- In general, to solve any behavioural DSM issue, all *Behaviour Changers* need to collaborate and communicate with each other and the *End Users* whose behaviour they are trying to change.
- Creation of a clear regulatory framework that would minimise the uncertainties surrounding the uptake of green leases and green leasing practices is crucial.
- Strengthening the legal aspects of green leases would provide clarity and assurance to the actors involved, and thereby reduce the perception of risks associated with green leases by the market actors.
- The introduction of policy tools and the creation of stakeholder platforms would increase the knowledge about green leases and encourage their use.
- Identification of the most relevant and effective issues that could be included in green leases in a local context is important to keep green leases relevant to the market actors.
- Additionally, evaluating success and challenges of green leasing pilots and publishing case studies and cross-country comparisons can contribute to market uptake in a positive way.
- Encouraging industry interest organisations also plays a key role in creating awareness regarding green leases and push for a change in the leasing practices on the market. Such organisations can provide guidance for the market actors and even act as a mediator in cases of conflicts.
- Providers can also be instrumental in pushing for policy changes that would create favourable conditions for the uptake of green leases.
- An open dialogue and the discussion of mutual benefits through the green leasing process can create a stronger relationship between the landlord and the tenant, which would have a potential to go beyond the requirements of a green leasing agreement. Such relationships may result in sustainable solutions that could be adapted by both parties regardless of concerns over maximised benefits if there is an ambition to achieve a joint target, which is an environmentally-friendlier building.

The **green lease agreement** should therefore not be considered and promoted as the ultimate goal, but rather, a by-product of improved **green leasing practice** between the landlord and the tenant.

FINAL RECOMMENDATIONS

1. Make people your main focus
2. Have a variety of DSM- and behaviour change tools and best practice examples to learn from and share
3. Collaboratively identify your main issues and develop shared goals
4. Identify and evaluate multiple benefits of your intervention, from different stakeholder perspectives
5. Do not only focus on the product (green lease), but also on the process (green leasing).

SOURCES

Rotmann S., 2016: How to Create a 'Magic Carpet' for Behaviour Change, BEHAVE 2016

BELOK (2016): Background for Green Leases in Commercial Office Buildings – Sweden

BELOK (2018): Collaboration and Green Leasing: A case study of the Swedish Energy Agency's new office building in Eskilstuna

Fastighetsagarna (2011): *Grönt Hyresavtal*.

Janda, K., Rotmann, S., Bulut, M., and S. Lennander (2017): Advances in green leases and green leasing: Evidence from Sweden, Australia, and the UK. ECEEE Summer Study Proceedings, Hyéres, France

Subtask 8: Toolkit for Behaviour Changers

FURTHER INFORMATION

Contact Dr Sea Rotmann drsea@orcon.net.nz

Task 24 Phase 2: www.ieadsm.org/task/task-24-phase-2/

IRELAND POLICY BRIEF

- ***People* need to be the main focus when developing behaviour change interventions:** The transformation of the energy system can only be achieved sustainably and effectively, if the energy *End Users* are involved and their context and needs understood. Another group of people who are hugely important in successful behavioural interventions are *Behaviour Changers* from government, industry, research, the third and service sectors collaborating on intervention design, implementation and evaluation.
- A **variety of behaviour change tools and approaches** are needed to motivate and engage *Behaviour Changers* to implement these interventions successfully.
- **Evaluation of (non-kWh) co-benefits** is necessary to make the implementation of behavioural interventions more attractive and it is important to evaluate behavioural field pilots, such as the Irish one, to prove actual change has taken place.
- Using **Middle Actors to loan out Home Energy Saving Kits** was the chosen top issue for Ireland. It was aimed at empowering and educating Irish households to improve energy literacy and home energy performance. It informed and incorporated many of the tools in the "Subtask 8 – Toolbox for Behaviour Changers" and is an award-winning example for how to do behaviour change in practice.

WHAT'S THE ISSUE?

It is clear that current efforts and technologies will not be enough to achieve a 1.5C climate change target. Results from transformation studies show us that an effective change of our energy system can only work effectively if the affected *people* are involved in the process. In the Irish participation in the second phase of Task 24 we focussed on the following main issue: **Using Middle Actors to loan out Home Energy Saving Kits** to help Irish households improve energy literacy and home energy performance.

WHY IS THIS ISSUE IMPORTANT?

Behaviour Changers from many sectors came together to discuss and decide on the top issue for Ireland. They included *Decisionmakers* (from SEAI, the Sustainable Energy Authority of Ireland and the Department of Energy), *Providers* (CODEMA, the Dublin Energy Agency), *Experts* (primarily from M.CO but also from See Change institute), *Middle Actors* (public libraries, work places and schools) and the *Conscience* (SECs, Sustainable Energy Communities). They all acknowledged the importance of trusted Middle Actors to provide households with the tools to educate and empower them to improve their energy-using behaviours and home energy performance.

WHAT ARE HOME ENERGY SAVING KITS?

Several countries use home energy saving kits and we compared and contrasted them in a cross-country case study comparison (Rotmann, 2018a). These kits are usually loaned out for free using Public Libraries as "Middle Actors", though they are also provided by utilities (in the US), and were tested with schools and work places in Ireland.

In Ireland, they contained six measurement tools to assess current energy use, or determining/fixing the (in)efficiency of:

- **heating** (radiator key),
- **appliances** (plug-in energy monitor),
- **insulation** (thermal leak detector),
- **fridge/freezer** (fridge thermometer)
- **thermal envelope** (digital thermometer and humidity metre)
- **water** (stopwatch to measure water flow in e.g. shower)

The CODEMA home energy saving kit

We undertook an in-depth evaluation of the performance of such kits in both Ireland (see SEAI, 2018) and New Zealand (Rotmann, 2018b). Use of the Task 24 "beyond kWh" toolkit was assessed using pre-and post-

surveys in Ireland (Rotmann & Chapman, 2018) and qualitative and quantitative data (SEAI, 2018) was triangulated to provide further insights.

HOW CAN WE CREATE CHANGE?

Once the main issue was identified, we used tools like the Task 24 *Behaviour Changer Framework* (Rotmann, 2016) and design thinking to delve deeper into understanding our *End User* target for behaviour change better. Mapping out the user journey, highlighting potential pain points and using a collective impact approach to create common goals, shared measurements, continuous communication and reinforcing activities, whilst having backbone support, were winning components of the Irish pilot. In-depth measurements and evaluation, triangulating quantitative and qualitative data, further provided invaluable insights. An international cross-country comparison helped to assess how well the Irish pilot performed compared to what other countries were doing, and have learned. Its solid combination of social science, design thinking and participatory action research catapulted it to the top of the leader board.

WHAT CAN POLICY MAKERS LEARN FROM THIS?

In general, to successfully solve any behavioural DSM issue, all relevant *Behaviour Changers* need to collaborate and communicate with each other and with the end users whose behaviour they are trying to change. It is advised to avoid silos and to use a collective impact approach to design, implement and evaluate field-based pilots, re-iterating them before national roll-out.

From the cross-country case study comparison (Rotmann 2018a) it became clear that even though project managers regard these kits as highly successful, they were not able to point to any actual behavioural changes that resulted from high loan rates of the kits. Better measurement and verification, like the Task 24 pre- and post-survey “beyond kWh” tool, used in SECs and the interviews, surveys and focus groups undertaken by the primary experts M.CO, is one way to better understand what the main barriers to uptake are and what other support households expect from the government. This pilot has already been expanded to include different Middle Actors in Ireland.

FINAL RECOMMENDATIONS

1. Make people your main focus
2. Have a variety of DSM- and behaviour change tools and international best practice examples to learn from and share
3. Collaboratively identify your main issues and develop shared goals
4. Identify and evaluate multiple benefits of your intervention, from different stakeholder and end user perspectives
5. Assess feedback on barriers to uptake, re-iterate and test your pilot accordingly
6. Co-create pilots and field research trials.

SOURCES

Rotmann S., 2016: How to Create a ‘Magic Carpet’ for Behaviour Change, BEHAVE 2016

Rotmann S., 2018a: Cross-Country Case Study Comparison Ireland – Home Energy Saving Kit Library Programmes

Rotmann S., 2018b: Case Study Analysis – Home Energy Audit Tool (HEAT) kits in New Zealand

Rotmann & Chapman, 2018: Evaluation Report for Home Energy Saving Kits: Using Bayesian Modelling to test the “beyond kWh” toolkit in Ireland

SEAI, 2018: Final Report Ireland – Home Energy Saving Kit Programmes

Subtask 8: Toolkit for Behaviour Changers

FURTHER INFORMATION

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Task 24 Phase 2: www.ieadsm.org/task/task-24-phase-2/

THE NETHERLANDS POLICY BRIEF

- Despite effective mechanisms such as Long Term Agreements and Green Deals, there are ample opportunities to **speed up the pace** in shaping the efficiency side of the energy transition in The Netherlands.
- The analysis of feedback from Dutch experts shows that the **higher education sector** with its large energy efficiency potential, expert knowledge, openness to change and out-reach to other sectors, is the most promising sector for successful behaviour change interventions.
- Focus on **ICT**, both as heavy user and as a tool for tailoring and reducing of demand will lead to energy savings and innovation.
- Immediate action: strengthen bottom-up pressure on decision makers by enabling the Green Offices to take up this role.
- Mid-term action: development of mechanisms to influence the key performance indicators of decision makers, using experiences with non-energy benefits, green bonds, etc.

TASK 24 - SCOPE AND OBJECTIVES

Environmental and societal pressure continue to rise, and OECD governments are doing more and more to meet rising energy needs with greater sustainability policies. Low carbon policies and targets, as well as the *Paris Accord* are shaping the future of our energy system. We have taken big inroads into increasing the proportion of renewable energy technologies, with rapid cost reductions and are tracking towards low carbon electricity production.

However, it is clear that current efforts and technologies will not be enough to achieve a 1.5C climate change target. Results from transformation studies show us that an effective change of our energy system is impossible without the involvement and commitment of all stakeholders to the process. This also requires changes in the behaviour of each stakeholder. Task 24 of the Demand-Side Management Programme of the International Energy Agency addresses this challenge, with the purpose to apply available scientific methods for behaviour change in practice, and to contribute to the existing body of knowledge on changing energy-related human behaviour.

METHOD OF ACTION

In each participating country – Ireland, Austria, Sweden, the US, the Netherlands and New Zealand - the following steps were taken:
1) Analysis of the potential and attainability of behaviour change in DSM in different sectors,
2) Selection of one top issue and sector for a behavioural intervention, based on the insights of the *Collective Impact Approach* in association with relevant *Behaviour Changers*. We use a *Behaviour Changer Framework* and other creative and engaging Task 24 tools, such as storytelling. All are used to help design and measure tangible uptake of behaviour change interventions.
3) Identify lessons learnt and ways forward.

EXPERIENCE IN THE NETHERLANDS

To identify the most promising sector for a behavioural intervention, the Dutch Task 24 team of experts analysed both the energy efficiency potentials and the attainability of success for the different Dutch sectors. This was based on the review of Dutch policy papers, existing mechanisms, and statistical data.[2]

The outcome of the analysis showed that the higher education sector, being a sector with a large energy efficiency potential, expert knowledge and openness to change, was the best option for a successful Dutch behavioural intervention in the context of the Task 24 participation. The analysis also showed the opportunities of ICT, both as 'heavy user' and as tool for tailored and reduced energy demand. These outcomes formed the basis for the next step: preparation of the behavioural intervention.

IDESK STUDY AND BEHAVIOURAL INTERVENTION

The second phase of Task 24 in the Netherlands started off with an international desktop study on results and success factors of past and existing efforts to utilise the potential of the higher education sector. On the basis of the *Collective Impact Approach*, two case studies from the Universities of Cambridge and Utrecht were assembled and described in detail, to identify the factors that were critical to success. [3]

The behavioural intervention was organised in one of the Universities in The Netherlands, Rijksuniversiteit Groningen (RUG). Following the Task 24 *Behaviour Changer Framework*, the main stakeholders were identified and interviewed to disclose their key issues and agendas. They were then brought together in a series of workshops to establish the roadmap going forward towards improving energy efficiency by using ICT.

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[2] See Annex B of Dutch report on Task 24 https://www.iea.org/task/task-24-phase-2/

[3] See Cobben (2017). Case Study Analysis NL – Higher Education in ICT. IEA DSM Task 24. http://www.ieadsm.org/wp/files/ST67-NL-ICT-case-study.pdf

LESSONS LEARNT

Critical conditions for success are:

- *All* stakeholder groups need to be involved in intervention design from the start.
- Decision-makers are driven first and foremost by their key performance indicators (KPIs). Thus, a policy framework to influence their KPIs is necessary to influence investment decisions in favour of energy efficiency measures.
- A clear problem-owner, able to create and maintain ongoing bottom-up pressure on the Decision-makers, is a necessary condition to accelerate the funding and uptake of energy efficiency measures.
- The institutional climate has to facilitate the cooperation between all *Behaviour Changers* in a higher education institution.
- Collaboration requires knowledge and understanding of all issues, positions and agendas, and consensus on goals and processes.
- A *Collective Impact Approach*, as championed by Task 24, provides the necessary framework conditions and tools for success.
- Framing energy efficiency measures in the context of the overall transition to a sustainable and circular economy, as well as the threats posed by climate change, will increase the *Behaviour Changers'* commitment and sense of urgency.

ROAD FORWARD IN THE NETHERLANDS

The Netherlands have several mechanisms in place to realise the energy-saving potentials in the Higher Education sector, provided some incentives for investments for energy efficiency are created.

Programmes such as 'Green Deal' and 'Duurzaam Door' are excellent frameworks to accelerate the uptake of existing technologies and stimulate the development of new applications and innovation.

As an immediate action, Dutch policy makers could strengthen the Universities' existing *Green Offices* to take up the role as problem owner and change agent. Over the medium term, mechanisms to influence Decision-makers' KPIs in favour of energy efficiency could be developed.

FURTHER INFORMATION

Full Country Report Netherlands: www.ieadsm.org/task/task-24-phase-2/

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Task 24 meetings and conferences

Task 24 Expert Workshops & stakeholder meetings (Phase I)

Date	Place	# of Experts	# of Countries	Type of meeting	Government	Industry	Academic
10/4/12	Utrecht, NL	23	4	XM	4	9	10
10/4/12	Graz, AUT	5	2	SHM	4	1	1
11/4/12	online	13	6	XM	2	2	9
3/5/12	online	6	5	XM	1	1	4
30/8/12	Utrecht, NL	20	1	SHM	2	12	6
7/9/12	Brussels, BE	24	8	XM	3	8	13
9-10/ 10/12	Oxford, UK	65	9	XM	3	13	39
26/10/12	online	6	5	XM		2	4
12/11/12	online	6	5	XM		2	4
17/12/12	Wellington, NZ	10	1	SHM	8	1	1
20/12/12	Utrecht, NL	22	1	SHM	1	14	7
7/2/13	online	6	5	XM		2	4
15/2/13	Wellington, NZ	50	4	XM	15	15	20
22/5/13	Graz, AUT	10	2	SHM	9	1	
27-29/5	Trondheim, NO	20	8	XM	1	3	17
15/6/13	Milan, IT	15	2	SHM	14	1	
17/6/13	Dubai, UAE	30+	3	SHM	5	15	other (kids)
21/8/13	Wellington, NZ	6	1	SHM	4	1	1
10/10/13	Stockholm, SE	12	2	SHM	4	1	7
15/10/13	Luzern, CH	30	9	XM	3	12	15
17/10/13	Brisbane, AUS	12	2	SHM	10	2	
17/12/13	Wellington, NZ	40	1	SHM	30	4	6
17/03/14	Wellington, NZ	55	10	XM	25	15	15
05/09/14	Oxford, UK	18	8	XM	2	3	13
Feb & July 2014	Wellington, NZ	5	1	SHM	3	2	
12/5/14	Brisbane, AUS	12	2	SHM	10	2	
3/10/14	Milan, Italy	10	2	SHM	7	2	1
13-14/14	Graz, Austria	40	9	XM/SHM	20	5	15
24/10/14	London, UK	12	2	XM	5	2	5

XM = Experts meeting
SHM = Stakeholder meeting
In green = national expert workshops and webinars

Phase II – Expert and stakeholder meetings

Date	Place	# of Experts	Type of meeting	Govt	Industry	Academic
27/05/15	Toronto, Canada	13	SHM	2	9	2
03/06/15	Eceee summer study	50	Experts	10+	5+	30+
11/06/15	Stockholm, SE	8	SHM	3	4	1
14/06/15	London, UK	12	SHM	3	2	7
23/09/15	Wellington, NZ	12	SHM	3	6	3
19/10/15	Sacramento, US	15	Experts	2	4	9
21/10/15	Sacramento	31	Experts	4	9	18
26/10/15	Toronto, CA	15	Experts	2	11	2
2/11/15	San Francisco	30	SHM	4	24	2
Nov 2015	Paris, France	40	Experts	15	15	10
Nov 2015	Dublin, Ireland	>60	SHM	20	20	20
Dec 2015	Brisbane, AUS	10	SHM	7	3	
Feb 2016	Eindhoven, NL	25	SHM			25
Feb 2016	Wellington, NZ	12	SHM	3	6	3
Mar 2016	Stockholm, SE	10	SHM	4	3	3
Apr 2016	Dublin, IE	12	SHM	6	3	3
Jun 2016	Wellington, NZ	8	IEA	4	2	2
Jul 2016	Wellington, NZ	35	SHM, EX	10	10	15
Sep 2016	Coimbra, PO	70+	EX			
Oct 2016	Stockholm, SE	10	SHM	4	4	2
Oct 2016	Charlotte, N.C.	15	SHM	1	12	3
Jan 2017	Dublin	15	SHM	8	5	2
Feb 2016	Charlotte, N.C.	20	SHM		16	4
Mar 2017	Netherlands	?	SHM			
May 2017	Stockholm	10	SHM	4	3	
May 2017	Graz	15	SHM	1	12	
May 2017	Dublin	10	SHM	8	2	
Sep 2017	Graz	20	SHM		16	
Mar 2018	Charlotte, N.C.	20	SHM	8	5	2
Apr 2018	Wellington	20	SHM			
May 2018	Boston, US	50	SHM	1	45	4
Oct 2018	Washington, DC	25	SHM			
Jan 2019	Boston	30	SHM		30	
Mar 2019	Online	15	SHM		15	

Seminars and conferences Task 24 was presented at (Phase I)

Date	Place	Total # Experts	# of countries	Type of meeting
8/5/12	Linköping, SE	20	2	Presentation to University
29-31/8/12	Basel, CH	~300	15+	Task Presentation at 3rd Intl Sustainability Conference
19/9/12	Helsinki, FI	20	3	Task Presentation to Finnish Experts
20-21/9/12	Helsinki, FI	~250	15+	Task Presentation and session chairing at BEhavE conference
24-25/10/12	Berlin, GER	100s	10+	Attendance at EEIP 'Energy Recovery in Industry: Opportunity for energy efficiency' conference
13-14/2/13	Wellington, NZ	100+	6	National Energy Research Institute conference 'Energy at the Crossroads'
13/3/13	Paris, FR	30+	28	Presentation to IEA Secretariat Behaviour Workshop 'Choices, Decisions and Lifestyles Roundtable'
24/4/13	Utrecht, NL	50+	12	DSM Workshop 'The NL Polder Model', 2 presentations
7/6/13	Hyéres, FR	450+	45	eceee summer study, 1 presentation, 3 informal sessions
8/7/13	Nisyros, Greece	100+	10+	Task 24 presentation by Swiss expert at ELCAS
7/10/13	Copenhagen, DE	100+	15+	IEEE ISGT conference - also leading Consumer Behaviour panel
16/10/13	Luzern, CH	30+	10+	IEA DSM Workshop
8/10/13	Stockholm, SE	8	2	Presentation at Technical Institute Stockholm
11/10/13	Brisbane, AUS	25	2	Skype lecture to Qld University energy efficiency course
20/11/13	Sacramento, US	500+	15+	BECC Conference presentation
20/11/13	Sacramento, US	25+	6	Transport panel at BECC conference
2/12/13	Flanders, BE			Smart Grid conference
12/12/13	Bonn, DE			Expert Roundtable on Energy Efficiency & Behaviour in Developing Countries, German Development Institute
18/3/14	Wellington, NZ	>100	12	NERI conference
12/5/14	Brisbane, AUS	15	2	Lecture at International Energy Center
9/8/14	Washington DC, USA	<100/10000	>25	APA conference
4/9/14	Oxford, UK	<300	>20	BEHAVE conference
11/9/14	Berlin, GER	180	>15	IEPPEC conference
10/10/14	Brisbane, AUS	>10	2	IEC Skype Lecture
23/10/14	Sheffield, UK	>40	2	Seminar at Sheffield Hallam Uni
21-22/1/15	Milan, IT			ESCO lecture
14/1/15	DSM University (online)			Task 24 webinar

Phase II – Seminars, lectures and conferences

Date	Place	Total # of Experts	Type of meeting	Govt	Industry	Academic
26/05/15	Toronto, CA	40+	Seminar	10	25	5
11/06/15	Stockholm, SE	20	Seminar	20		
13/05/15	DSM University	>100	Webinar			
02 to 06/06	eceee summer study	500	Conference			
19/10/15	BECC	700	Conference			
28/09/15	Australia	20+	Lecture			
Nov 2015	Dublin	>60	Mini conference	20	20	20
Dec 2015	Australia	20+	Lecture			20+
Dec 2015	Eindhoven, NL	30	Lecture	10	20	90
Feb 2016	Wellington, NZ	50+	Workshop		50+	
Apr 2016	Vienna, AT	>150	Workshop			
Jul 2016	Wellington, NZ	>250	Conference			
Aug 2016	Monterey, US	>1500	Conference			
Sep 2016	Australia	20+	Lecture			20+
Sep 2016	Coimbra, PO	30	Lecture			
Oct 2016	Stockholm, SE	80	Conference			
Feb 2017	Charlotte, N.C.	12	Expert panel		8	4
Feb 2017	Wellington, NZ	>50	Conference			
May 2017	Dublin, IE	~80	Conference			
Jun 2017	eceee summer study	500	Conference			
Jun 2017	IEA Secretariat	70	IEA workshop			
Oct 2017	BECC	700	Conference			
Oct 2017	EGRD, Copenhagen	30	IEA workshop			
Oct 2017	Australia	>20	Lecture			
Dec 2017	DSMU	150	Webinar			
Jun 2018	EU Sustainable Energy Week	~100s	Conference			
Aug 2018	ACEEE Summer Study	~700	Conference			
Sep 2018	BEHAVE	~400	Conference			
Oct 2018	BECC	~700	Conference			
Feb 2019	SFEM	~50	Workshop			
Mar 2019	EU Commission	~40	Storytelling Workshop, Keynote			
Apr 2019	IEA DSM	~30	DSM Day			
May 2019	BC Hydro	~30	Keynote			

Task publications

Task 24 Publications, films and reports – Phase I

- IEA DSM Initial Positioning Paper on Behaviour Change*
- IEA DSM Task 24 Final Workplan*
- IEA DSM Spotlight Issues (6 stories)*
- IEA DSM Task Flyer 24 (updated and final)*
- IEA DSM website Task 24*
- Positioning paper and minutes from Brussels workshop*
- Positioning and definitions paper and UKERC report from Oxford 2012 workshop*
- 25 minute professional film summarising Oxford workshop
- Template for Models of Understanding Behaviour via Case studies in 4 domains
- IEA DSM Task 24 Pecha Kucha presentation (powerpoint/film)^
- 6 participating countries' Pecha Kucha presentations (powerpoint/film)^
- Interviews of experts' own energy stories (film, over 30 so far)^
- NZ World Café report-back (film/presentations/documents)^
- ECEEE summer study (2013) paper on Task 24 by Rotmann and Mourik*
- ELCAS (2013) paper by Carabias-Hütter, Lobsiger-Kagi, Mourik and Rotmann (2013)*
- BECC (2013) presentations on Task 24 and transport behaviour^
- Overview of definitions and how they were derived (powerpoint)*
- Overview of models of understanding behaviour (powerpoint/film)^
- NL, Swiss and NZ stakeholder analyses (Excel)^
- Implementation bloopers (powerpoint/film)^
- 10 presentations on various aspects of behaviour change models (powerpoint/film)^
- Interview with www.energynet.de (podcast)
- "The Monster" Analysis of Subtask 1 (160pp report)*
- The Monster Task 24 Wiki^
- The Little Monster storybook (self-published booklet)*
- Green Growth Article (2013)*
- Presentation to Energy Savers Dubai, UAE June 2013
- Presentation and 3 informal workshops at eceee June 2013
- Task 24 presentations at RSE (Milan, Italy); Leeds University (UK); Linköping University (Sweden); Stockholm Technical Institute (Sweden); Grazer Energy Agency (Austria); Energy Efficiency and Conservation Authority and Ministry of Business, Employment and Innovation (both New Zealand); UC Irvine (USA); International Energy Center (Australia); Queensland Government (Australia); Sheffield Hallam University (UK)^
- Conference and workshop presentations at Utrecht DSM workshop (NL); eceee Summer Study (France); ELCAS (Greece); IEEE ISGT (Denmark); Luzern DSM Workshop (CH); BECC conference (US); BEHAVE conferences (Finland and UK); Espoo DSM Workshop (Finland)^
- Energy Expert Stories short film
- Filmed presentations from Storytelling workshop in Wellington (youtube)
- ESCo Facilitators report and 5 page summary for Task 16*
- Articles for Energy Efficiency in Industrial Processes Magazine (http://www.ee-ip.org/)
- Evaluation Paper for IEPPEC*
- Task 24 – Subtask 3: eceee 2015 summer study evaluation paper
- Task 24 – Subtask 3: From calculated to real energy savings performance evaluation: an ICT-based methodology to enable meaningful do-it-yourself data collection
- Task 24 – Subtask 5: eceee 2015 summer study storytelling paper
- Six ST2 country case study reports (NL, NZ, SE, NO, AT, CH)*
- Eight ST4 country recommendations*
- Three ST3 reports*

* indicates reports that are on the IEA DSM Task 24 website

^ indicates presentations and films etc. found on the invite-online online expert platform

Phase II publications

(not highlighted are reports for National Expert use only or as-yet unpublished reports):

- Subtask 6&7 - Final Report Austria
- Final Report to Funding Agency in Austria [in German]
- Subtask 6&7 - Final Report The Netherlands: Executive Summary plus Annexes
- Subtask 6&7 - Case Study Analysis - ICT Use in Higher Education - The Netherlands
- Subtask 6&7 - Final Report Sweden
- Subtask 6&7 -Background for Green Leases in Commercial Office Buildings - Sweden
- Subtask 6&7 - Collaboration and Green Leasing: A case study of the Swedish Energy Agency's new office building in Eskilstuna
- Subtask 6&7 - Final Report New Zealand
- Subtask 6&7 - Case Study Analysis - Home Energy Audit Tool (HEAT) kits in New Zealand
- Subtask 6&7 - Final Report Ireland
- Subtask 6&7 - Cross-Country Case Study Comparison Ireland - Home Energy Saving Kit Library Programmes
- Subtask 6&7 - Cross-Country Case Study Comparison Ireland - Database of Energy Saving Kit Programmes
- Subtask 6&7 - Final Report USA
- Subtask 8 - The A to Z of Storytelling in Task 24
- Subtask 8 - Template for Focus Groups in Task 24
- Subtask 8 - Case Study Templates in Task 24
- Subtask 8 - Decision-making Tree for Subtask 1 "Monster" case study analysis
- Subtask 8 - Toolbox for Behaviour Changers
- Subtask 9 - Dimensions of Energy Behavior: Psychometric Testing of Scales for Evaluating Behavioral Interventions in Demand Side Management Programs
- Subtask 9 - Evaluation Report for Home Energy Saving Kits: Using Bayesian Modelling to test the "beyond kWh" toolkit in Ireland
- Subtask 10 - Policy Brief Austria
- Subtask 10 - Policy Brief the Netherlands
- Subtask 10 - Policy Brief Ireland
- Subtask 10 - Policy Brief Sweden
- Subtask 10 - Policy Brief New Zealand
- Subtask 10 - Policy Brief USA
- Subtask 10 - The overarching story of Task 24
- Subtask 11 - CHS case study: Designing a successful behaviour change programme for hospital building staff

Peer-reviewed publications:

- Subtask 6 - K. Janda, S. Rotmann, M. Bulut and S. Lennander (2017), *Advances in green leases and green leasing: Evidence from Sweden, Australia, and the UK,* ECEEE Summer Study Proceedings, Hyéres, France.
- Subtask 6 - S. Rotmann and D. Chapman (2018). ENERGY SAVING KITS – EDUCATING AND EMPOWERING END USERS? A Cross-Country Case Study Comparison. BEHAVE conference 2018, Zürich, Switzerland.
- Subtask 6 - S. Rotmann and K. Ashby (to be published). Gained in Translation: Evaluation Approaches for Behavioural Energy Efficiency Programmes in the US and Canada. ECEEE Summer Study, 2019.
- Subtask 6 - M. Bulut, S. Rotmann and K. Janda (to be published). Green Leasing in Commercial Office Buildings in Sweden. ECEEE Summer Study, 2019.
- Subtask 8 - S. Rotmann (2016a), *How to Create a 'Magic Carpet' for Behaviour Change*', ACEEE Summer Study Proceedings, Monterey, USA.
- Subtask 8 - S. Rotmann (2016b), *How to Create a 'Magic Carpet' for Behaviour Changers,* BEHAVE Conference, Coimbra, Portugal.
- Subtask 8 - S. Rotmann (2017a), *"Once upon a time…" Eliciting energy and behaviour change stories using a fairy tale story spine*, Energy Research and Social Science, Special Issue 31 on *Narratives and Storytelling in Energy and Climate Change Research.*
- Subtask 8 - S. Rotmann (2017b), *Task 24: Co-creating behaviour change insights with Behaviour Changers from around the world,* ECEEE Summer Study Proceedings, Hyéres, France.

- Subtask 8 - Special Issue on "Narratives and Storytelling in Energy and Climate Change Research", ERSS Volume 31, September 2017.
- Subtask 8 - M. Moezzi, K. Janda and S. Rotmann (2017), *Using stories, narratives, and storytelling in energy and climate change research*, Energy Research and Social Science, Special Issue on *Storytelling in Energy and Climate Change Research.*
- Subtask 9 - B. Karlin, R. Ford and C. McPhearson Frantz (2015), *Exploring Deep Savings: A Toolkit for Assessing Behavior-Based Energy Interventions*, IEPEC Conference, Long Beach, USA.
- Subtask 9 - B. Karlin, R. Ford and C. McPhearson Frantz (2016), *Evaluating Energy Culture: Identifying and validating measures for behaviour-based energy interventions*, IEPEC Conference, Amsterdam, Netherlands.
- Subtask 9 - S. Rotmann and D. Chapman 2018). Evaluating Energy Saving Kit Impacts – Are they educating and empowering end users to change behaviors? A Cross-Country Case Study Comparison. BECC Conference, Washington D.C., October 2018.
- Subtask 11 - K. Cowan, R. Sussman, S. Rotmann and E. Mazzi (2018). It's Not my Job: Changing Behavior and Culture in a Healthcare Setting to Save Energy. ACEEE Summer Study Monterey, US.

Workshop Minutes (not highlighted for National Experts only):

- Subtask 6 and 7 - ECEEE Summer Study Task 24 workshop minutes (2015 and 2017)
- Subtask 6 and 7 - BECC conference Task 24 workshop minutes (2015)
- Subtask 6 and 7 - BEHAVE conference Task 24 workshop minutes (2016 and 2018)
- Subtask 6 and 7 - Canada Workshop minutes
- Subtask 6 and 7 - Sweden workshop minutes
- Subtask 6 and 7 - Ireland workshop minutes
- Subtask 6 and 7 - Netherlands workshop minutes
- Subtask 6 and 7 - New Zealand workshop minutes
- Subtask 6 and 7 - Austria workshop minutes
- Subtask 6 and 7 - US/CEE workshop minutes
- Subtask 11 - Atrium Health Services workshop minutes (USA)
- Subtasks 6 and 7 - Combined workshop minutes

Articles, blogs, Spotlight etc:

- Task 24 – Phase II Flyer
- Task 24 Policy Brief
- Spotlight September 2015 - Task 24: Helping the Behaviour Changers
- Spotlight December 2015: New Publication - Task 24 Subtask 2: The 'Energy Hunt' in Austria
- Spotlight June 2016 - Task 24 and Annex 66: A beautiful collaboration is emerging
- Spotlight March 2017 - Task 24: Creating 'Magic' with non-state actors
- Spotlight June 2017 - Dr Sea Rotmann: DSM Day in Dublin - Behavioural insights on energy efficiency in the residential sector
- Spotlight September 2017 - HOT OF THE PRESS: A new publication on storytelling
- University Health Network (UHN) Toronto: Talkin' Trash with UHN
- Energy News - Energy Projects need to center on End Users
- Energy in Demand - IEA DSM collaboration programme's Task 24 Gets Published in Special Issue on 'Storytelling and Narratives in Energy and Climate Change Research'
- eceee News - Special issue of the ERSS journal discusses narratives and storytelling, as a supplement to traditional scientific methods
- IEA Expert Group on Research and Development (EGRD), 2018. Towards a consumer-driven energy system.
- Spotlight June 2018 - Task 24 insights on Energy Saving Kit Programmes
- Spotlight September 2018 - Task 24's latest participants: the US and Canada via the Consortium for Energy Efficiency
- Task 24 - Final Flyer

IEA DSM News Blog

- April 26, 2016: Task 24 is co-editing a Special Edition on Storytelling
- Dec 21, 2017: New IEA DSM Task 24 report and webinar: How to co-design a successful hospital behaviour change programme
- June 15, 2018: Task 24 releases cross-country case study comparison on Energy Saving Kit Programmes

ExCo Updates (ExCo only):

- 46th ExCo Meeting Status Update, Halifax October 2015
- 47th ExCo Meeting Status Update, Stockholm March 2016
- 48th ExCo Meeting Status Update, Brussels October 2016
- 49th ExCo Meeting Status Update, Dublin May 2017
- 50th ExCo Meeting Status Update, The Hague September 2017
- 51st ExCo Meeting Status Update, Bergen April 2018
- 52nd ExCo Meeting Final Status Update, London October 2018

Annual Reports:

- Task 24 - 5th Annual Report (2015)
- Task 24 - 6th Annual Report (2016)
- Task 24 - 7th Annual Report (2017)
- Task 24 - 8th Annual Report (2018)

Online sharing and administration of Task 24

- Widely disseminated via @IEADSM on twitter (also @DrSeaRotmann), IEADSM facebook group; ECEEE and EEIP columns and various energy and behaviour LinkedIn groups
- Weekly publication of Behaviour Change & Energy News by Dr Sea Rotmann
- Expert platform www.ieadsmtask24.ning.com
- Task 24 dropbox (www.dropbox.com) to share templates and collected models etc.
- Task 24 wikipedia (www.ieadsmtask24wiki.info)
- Task 24 youtube channel (http://www.youtube.com/user/DrSeaMonsta/videos?flow=grid&view=0)
- Task 24 slideshare (http://www.slideshare.net/drsea)

IEA Demand Side Management Energy Technology Initiative

The Demand-Side Management (DSM) Energy Technology Initiative is one of more than 40 Co-operative Energy Technology Initiatives within the framework of the International Energy Agency (IEA). The Demand-Side Management (DSM) Energy Technology Initiative, which was initiated in 1993, deals with a variety of strategies to reduce energy demand. The following member countries and sponsors have been working to identify and promote opportunities for DSM:

Austria	Norway
Belgium	Spain
Finland	Sweden
India	Switzerland
Ireland	Canada
Italy	United Kingdom
Republic of Korea	United States
Netherlands	ECI (sponsor)
New Zealand	RAP (sponsor)

Programme Vision: Demand-side activities should be active elements and the first choice in all energy policy decisions designed to create more reliable and more sustainable energy systems
Programme Mission: Deliver to its stakeholders, materials that are readily applicable for them in crafting and implementing policies and measures. The Programme should also deliver technology and applications that either facilitate operations of energy systems or facilitate necessary market transformations

The DSM Energy Technology Initiative's work is organized into two clusters:
The **load shape cluster**, and
The **load level cluster**.

The 'load shape" cluster will include Tasks that seek to impact the shape of the load curve over very short (minutes-hours-day) to longer (days-week-season) time periods. Work within this cluster primarily increases the reliability of systems. The "load level" will include Tasks that seek to shift the load curve to lower demand levels or shift between loads from one energy system to another. Work within this cluster primarily targets the reduction of emissions.

A total of 24 projects or "Tasks" have been initiated since the beginning of the DSM Programme. The overall program is monitored by an Executive Committee consisting of representatives from each contracting party to the DSM Energy Technology Initiative. The leadership and management of the individual Tasks are the responsibility of Operating Agents.

These Tasks and their respective Operating Agents are:
Task 1 International Database on Demand-Side Management & Evaluation Guidebook on the Impact of DSM and EE for Kyoto's GHG Targets – Completed
Harry Vreuls, RVO, the Netherlands

Task 2 Communications Technologies for Demand-Side Management – Completed
Richard Formby, EA Technology, United Kingdom

Task 3 Cooperative Procurement of Innovative Technologies for Demand-Side Management – Completed
Hans Westling, Promandat AB, Sweden

Task 4 Development of Improved Methods for Integrating Demand-Side Management into Resource Planning – Completed
Grayson Heffner, EPRI, United States

Task 5 Techniques for Implementation of Demand-Side Management Technology in the Marketplace – Completed
Juan Comas, FECSA, Spain

Task 6 DSM and Energy Efficiency in Changing Electricity Business Environments – Completed
David Crossley, Energy Futures, Australia Pty. Ltd., Australia

Task 7 International Collaboration on Market Transformation – Completed
Verney Ryan, BRE, United Kingdom

Task 8 Demand-Side Bidding in a Competitive Electricity Market – Completed
Linda Hull, EA Technology Ltd, United Kingdom

Task 9 The Role of Municipalities in a Liberalised System – Completed
Martin Cahn, Energie Cites, France

Task 10 Performance Contracting – Completed
Hans Westling, Promandat AB, Sweden

Task 11 Time of Use Pricing and Energy Use for Demand Management Delivery- Completed
Richard Formby, EA Technology Ltd, United Kingdom

Task 12 Energy Standards - to be determined

Task 13 Demand Response Resources - Completed
Ross Malme, RETX, United States

Task 14 White Certificates – Completed
Antonio Capozza, CESI, Italy

Task 15 Network-Driven DSM - Completed
David Crossley, Energy Futures Australia Pty. Ltd, Australia

Task 16 Competitive Energy Services
Jan W. Bleyl, Graz Energy Agency, Austria / Seppo Silvonen/Pertti Koski, Motiva, Finland

Task 17 Integration of Demand Side Management, Distributed Generation, Renewable Energy Sources and Energy Storages
Seppo Kärkkäinen, Elektraflex Oy, Finland

Task 18 Demand Side Management and Climate Change - Completed
David Crossley, Energy Futures Australia Pty. Ltd, Australia

Task 19 Micro Demand Response and Energy Saving - Completed
Linda Hull, EA Technology Ltd, United Kingdom

Task 20 Branding of Energy Efficiency - Completed
Balawant Joshi, ABPS Infrastructure Private Limited, India

Task 21 Standardisation of Energy Savings Calculations - Completed
Harry Vreuls, SenterNovem, Netherlands

Task 22 Energy Efficiency Portfolio Standards - Completed
Balawant Joshi, ABPS Infrastructure Private Limited, India

Task 23 The Role of Customers in Delivering Effective Smart Grids - Completed
Linda Hull. EA Technology Ltd, United Kingdom

Task 24 Behaviour Change in DSM: Phase 1 - From theory to practice
Phase 2 – Helping the Behaviour Changers
Dr Sea Rotmann, SEA, New Zealand

Task 25 Business Models for a more Effective Market Uptake of DSM Energy Services
Ruth Mourik, DuneWorks, The Netherlands

For additional Information contact the DSM Executive Secretary, Anne Bengtson, E-mail: anne.bengtson@telia.com and visit the IEA DSM website: http://www.ieadsm.org